Ocean Influence on Continental Rain

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- Drought and Flood (precipitation anomalies) must have be driven by a moisture source (from the oceans)
- The teleconnection between continental rainfall and sea surface afar must be manifested through moisture transport across the coastline
- Moisture transport may be in different directions at different levels
- Our integrated transport gives the integrated effect of the surface advection and transport aloft

HYDROLOGIC BALANCE

$$\frac{\partial W}{\partial t} + \nabla \bullet \Theta = E - P$$

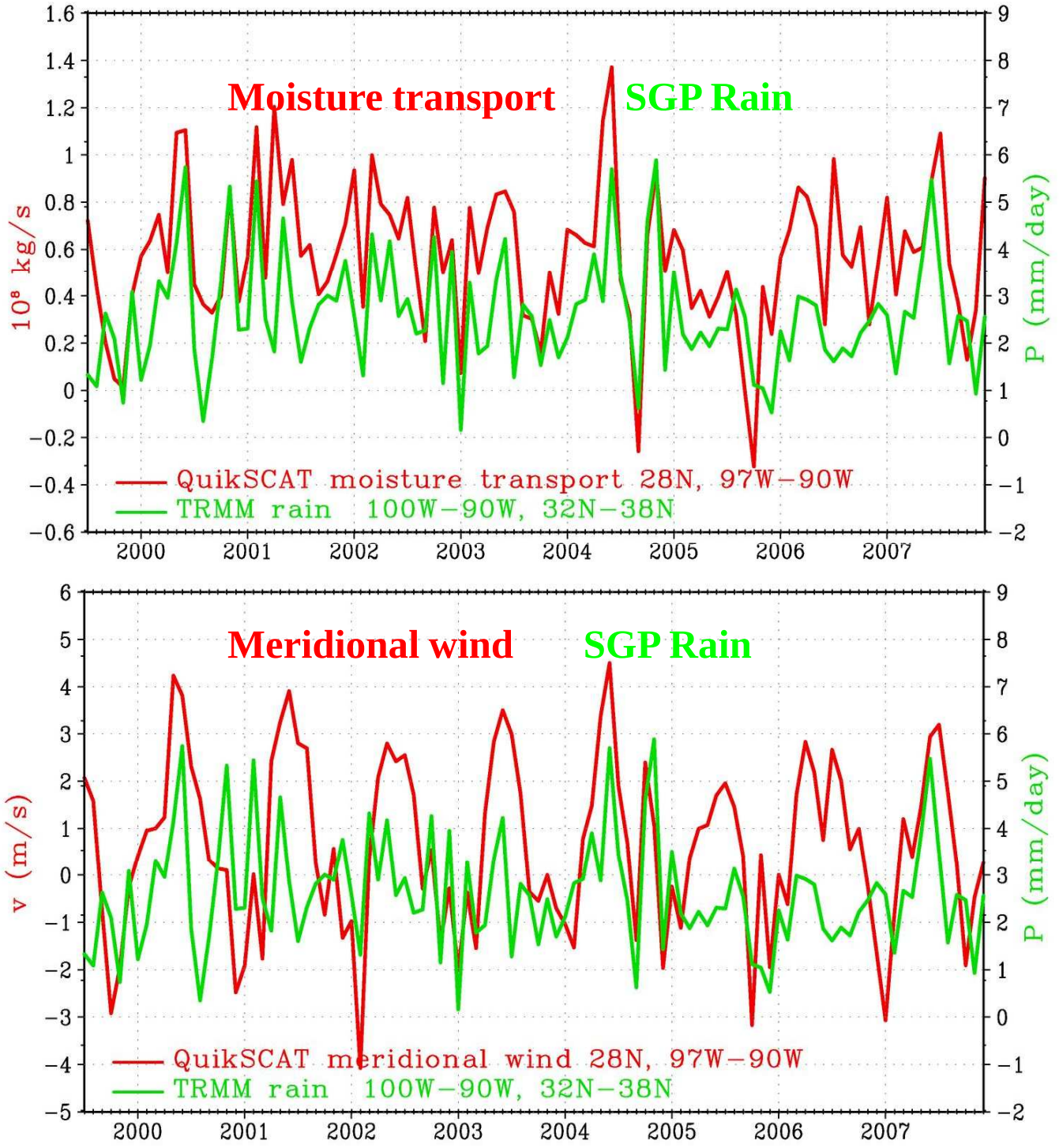
$$\Theta = \frac{1}{g}\int_0^{p0} qU\mathbf{d}p$$

$$W = \frac{1}{g}\int_0^{p0} q\mathbf{d}p$$

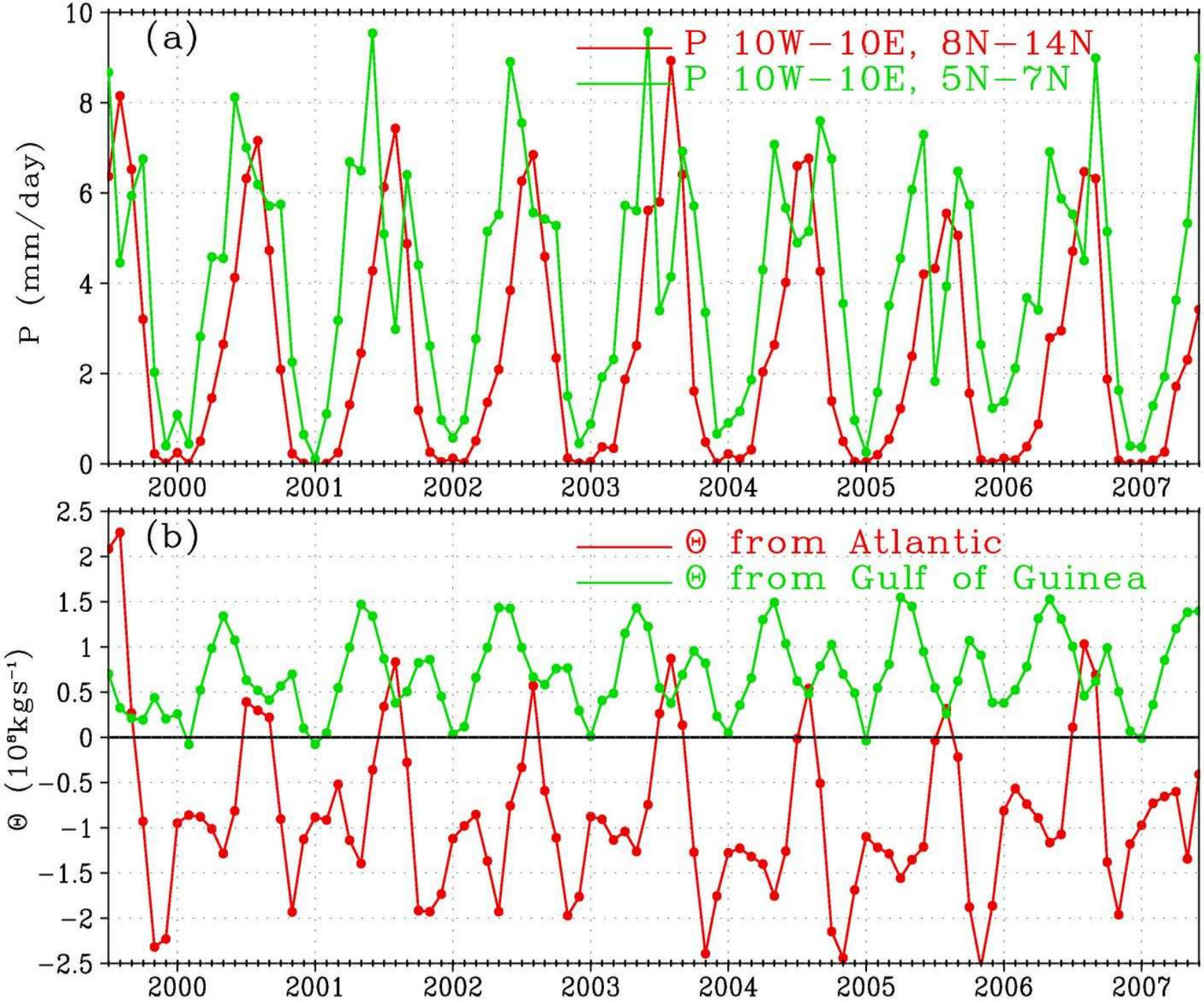
$$\Theta = \mathbf{Ue}\, W$$

Θ is equivalent to column water vapor W advected by Ue.
Ue is the depth-averaged wind weighted by humidity
We use SVR to relate Ue to wind at two levels:
1. U_N: scatterometer surface wind stress
2. U_{850mb}: cloud drift wind (free-stream wind)

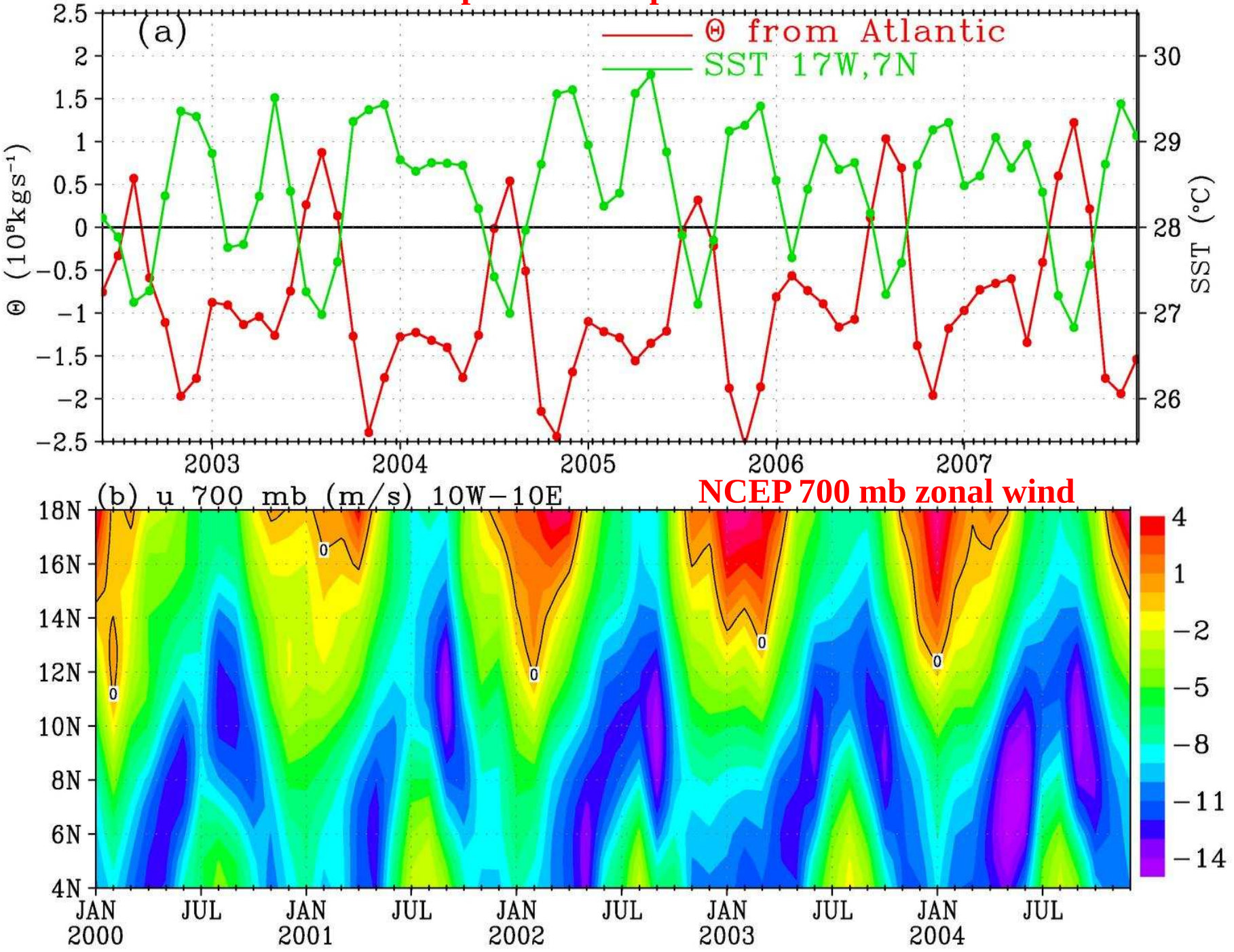
Southern Great Plains Rain Extremes



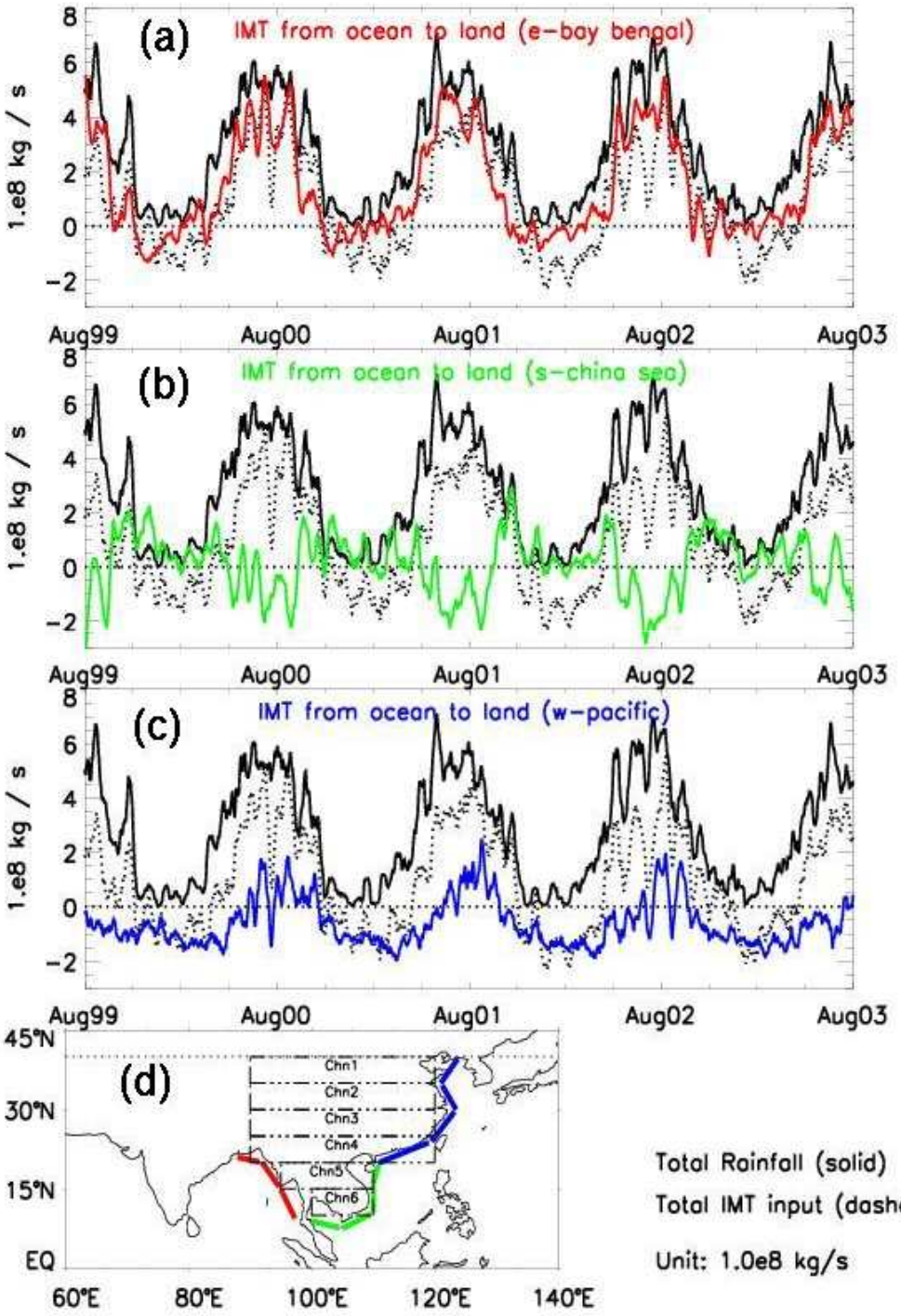
Sahel Precipitation Jump Paradox



Sahel Precipitation Jump Paradox - cont.



East Asian Monsoon



Moisture transport from Bay of Bengal

TRMM precipitation

Moisture transport from Southern Ocean

Moisture transport from Pacific